

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A process for continuously mixing and reacting at least two fluid streams, the process comprising:
 - a) flowing a first fluid stream through a first feed channel and injecting the first fluid stream in a substantially radial direction into a mixing chamber;
 - b) flowing a second fluid stream through a second feed channel and injecting the second fluid stream in a substantially tangential direction into the mixing chamber to create a vortex;
 - c) reacting the first and second fluids within the mixing chamber at reaction conditions and in the presence of a catalyst to yield a product stream, wherein the characteristic mixing time of the first and second fluid is less than the characteristic reaction time of the first and second fluids, and;
 - d) withdrawing the product stream from the central portion of the mixing chamber.
2. (Currently Amended) A process for continuously mixing and reacting at least two fluid streams, the process comprising:
 - a) flowing a first fluid stream through a first feed channel and injecting the first fluid stream in a substantially radial direction into a mixing chamber;
 - b) flowing a second fluid stream through a second feed channel and injecting the second fluid stream in a substantially tangential direction into the mixing chamber to create a vortex;
 - c) withdrawing a stream of mixed first and second fluids from the central portion of the vortex, wherein the characteristic mixing time of the first and second fluids is less than the characteristic reaction time of the first and second fluids, and;
 - d) reacting the stream of mixed fluids in a reaction zone at reaction conditions and in the presence of a catalyst to yield a product stream.

3. (Original) The process of claim 2 where the first fluid stream comprises a hydrogen feed stream and the second fluid stream comprises an oxygen feed stream, where hydrogen is present in an amount of less than about 3% by volume relative to the amount of both hydrogen and oxygen.
4. (Original) The process of claim 2 where the ratio of the kinetic energy of the second fluid to that of the first fluid is at least about 0.5 to yield a fluid vortex within the mixing chamber.
5. (Original) The process of claim 2 where the mixing chamber is substantially cylindrical in shape.
6. (Original) The process of claim 2 where steps (a) and (b) comprise flowing a plurality fluid streams through a plurality of feed channels and injecting the fluid streams in alternating tangential and radial directions into the mixing chamber.
7. (Original) The process of claim 2 where step (a) comprises accelerating the first and second fluid streams through the feed channels in the direction of the mixing chamber.
8. (Original) The process of claim 2 where step (b) comprises, prior to injecting the second fluid stream into the mixing chamber:
 - a) distributing the second fluid stream among a plurality of second distribution streams;
 - b) distributing a third fluid stream among a plurality of third fluid distribution streams, with the second and third distribution streams in a repeating sequence in the second feed channel.
9. (Original) The process of claim 2 further comprising separating the product stream into a heavy fraction and a light fraction and recycling either the heavy fraction or the light fraction to the mixing chamber.
10. (Original) The process of claim 2 where the first fluid stream is a gas and the second fluid stream is a liquid.
11. (Original) The process of claim 2 further comprising, after step (c), passing the stream of mixed first and second fluids through a conduit to the reaction zone, where the conduit diameter is less than about 200 μ m.